





Part 4. Ecoregions in Washington

Ecoregions reflect broad ecological patterns occurring on the landscape. In general, each ecoregion has a distinctive composition and pattern of plant and animal species distribution. Abiotic factors, such as climate, landform, soil, and hydrology are important in the development of ecosystems, and thus help define ecoregions. Within an individual ecoregion, the ecological relationships between species and their physical environment are essentially similar.

Because of this, using ecoregions to view the distribution of species and ecosystems across the landscape has emerged as a useful tool. Ecoregions make biological sense, compared to using politically derived lines, such as county, state or national boundaries. They also provide an ecological basis for partitioning the state into subunits for conservation planning purposes.

The ecoregion boundaries adopted in this document are derived from boundaries developed by the U.S. Environmental Protection Agency (2000). Minor modifications have been made to these boundaries in Washington by Natural Heritage Program scientists in consultation with conservation planning partners. The modifications result in a set of boundaries that better reflect local conditions, primarily because they have been drawn at a finer resolution and have taken into account on-the-ground knowledge regarding boundary placement.

Portions of nine ecoregions occur within Washington's borders. (See above map. See Figure 1 on page 6 for the full extent of the ecoregions.) Each ecoregion is described on the following pages. Descriptions include information on physiography, climate, biota, land ownership, biodiversity highlights, conservation needs, number of priority species and ecosystems, and a map showing the distribution of natural areas within the ecoregion. The purpose of including these descriptions is to provide the reader with a snapshot of each ecoregion; the statements regarding biodiversity highlights and conservation needs are not meant to be comprehensive.

Biodiversity Highlights

- Dominated by natural or semi-natural vegetation
- Large, healthy estuaries remaining
- Most rivers salmon-bearing
- High amphibian diversity
- High vascular plant endemism in the Olympic Mountains

Major Landowners

- National Park Service
- U.S. Forest Service
- Tribes
- DNR
- Private timber companies

Dominant Land Uses

- Forestry
- Recreation
- Conservation

Principal Risks

- Incompatibility of some timber management activities
- Low to medium density development in coastal areas and valley bottoms
- Non-native species

Conservation Needs

- Protection of forested wetlands
- Control of non-native species, particularly spartina and knotweed
- Protection of natural-origin forests in Willapa Hills and on Olympic Peninsula coastal plain
- Coordination of natural areas system and marine protected areas

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	7	20	41
Animals	13	7	13
Ecosystems	8	38	72

See the Natural Heritage Program website for list. Click on the site map/index at: www.dnr.gov.wa

Pacific Northwest Coast Ecoregion



BOHE RIVER NAP

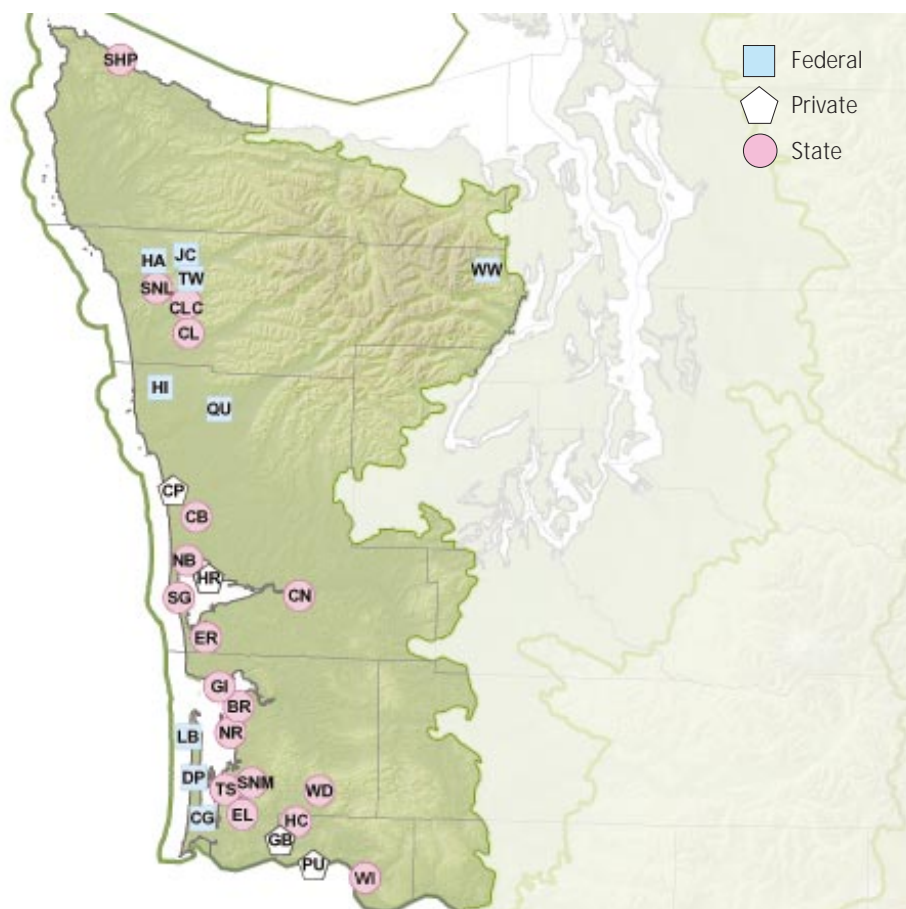
The Pacific Northwest Coast ecoregion includes most of the Olympic Peninsula of Washington, the coast mountain ranges extending down to central Oregon, and most of Vancouver Island in British Columbia. Approximately 11 percent of Washington is within this ecoregion. As of 1991, about 5 percent of the Washington portion had been converted to agricultural or urban uses (Washington GAP, 1997).

Physiography: The Olympic Mountains, the ocean coast and coastal plain, and the Willapa Hills are the ecoregion’s dominant landforms in Washington. Glaciated peaks in the Olympic Mountains rise to an elevation of nearly 8,000 feet above sea level. Streams and rivers typically begin as deeply incised, steep gradient drainages that eventually feed large, low-gradient river systems on the coastal plain. The coastal plain is up to 20 miles wide on the Olympic Peninsula and mostly underlain by glacial till and outwash. Major estuaries and associated dunes are found on the southern coast. The Willapa Hills are well-rounded highlands with old, well-weathered soils.

Climate: High precipitation typifies the ecoregion, averaging 60 to 240 inches annually. Most precipitation falls as rain from November through April. Snow pack and rain-on-snow zones cover a considerable area only in the Olympic Mountains. As a result of a rain shadow effect, the northeastern Olympic Mountains receive the lowest precipitation of equivalent elevations anywhere in western Washington. Along the outer coast and adjacent valleys, fog and cool temperatures in the summer are important climatic factors.

Biota: Coniferous forests dominate the vegetation of the ecoregion. Lowland forests are dominated by western hemlock, Douglas-fir, and western redcedar. In the coastal fog belt, Douglas-fir is rare and Sitka spruce becomes abundant. Forests in the mountains are mostly dominated by Pacific silver fir and mountain or western hemlock. High elevations in the Olympic Mountains have subalpine parkland and alpine habitats.

Two of the largest estuaries on North America’s west coast are part of this ecoregion. Other special habitats include coastal dunes, wetlands, riparian areas, and sphagnum bogs. The Olympic Mountains are rich in rare plant species due to their isolation, the number of unusual habitats, and the presence of steep environmental gradients. They include species endemic to the Olympic Mountains as well as species that are disjunct from other mountainous areas.



Some natural areas in this ecoregion are under dual ownership (state and private). The appropriate site name has been included in both ownership columns, but only one symbol has been placed on the map.

NATURAL AREAS IN THE PACIFIC NORTHWEST COAST ECOREGION IN WASHINGTON

Federal	State	Private
Cedar Grove RNA - CG	Bone River NAP - BR	Copalis River - CP
Diamond Point RNA - DP	Carlisle Bog NAP - CB	Ellsworth Creek - EL
Hades Creek RNA - HA	Chehalis River Surge Plain NAP - CN	Gray's Bay Wetlands - GB
Higley Creek RNA - HI	Clearwater Bog NAP - CL	Humtulpis River Delta - HR
Jackson Creek RNA - JC	Clearwater Corridor NRCA - CLC	Puget Island - PU
Leadbetter Point RNA - LB	Elk River NRCA - ER	
Quinault RNA - QU	Ellsworth Creek NRCA - EL	
Twin Creeks RNA - TW	Gunpowder Island NAP - GI	
Wet Weather RNA - WW	Hendrickson Canyon NRCA - HC	
	Niawiakum River NAP - NR	
	North Bay NAP - NB	
	Sand and Goose Islands NAPs - SG	
	Shipwreck Point NRCA - SHP	
	South Nemah NRCA - SNM	
	South Nolan NRCA - SNL	
	Teal Slough NRCA - TS	
	Whitcomb Flat NAP - SG	
	White Island NAP - WI	
	Willapa Divide NAP - WD	

Biodiversity Highlights

- Grasslands and oak woodlands, and associated rare plant and animal species
- Marine waters and associated species and habitats (e.g., estuaries)
- Salmon

Major Landowners

- Department of Defense
- National Park Service
- DNR
- Tribes
- State Parks
- WDFW

Dominant Land Uses

- Industrial / urban / suburban
- Military bases
- Forestry
- Agriculture

Principal Risks

- Continued rapid development
- Fire suppression
- Non-native species

Conservation Needs

- Protection and restoration of grasslands and oak woodlands, and their associated rare species
- Maintenance of existing large blocks of managed forest lands
- Conservation and restoration of estuarine marshes and tidal flats
- Restoration of riverine systems
- Protection of existing high-quality freshwater wetlands and bogs

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	7	17	28
Animals	19	9	12
Ecosystems	20	41	36

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Puget Trough Ecoregion

PUGET SOUND

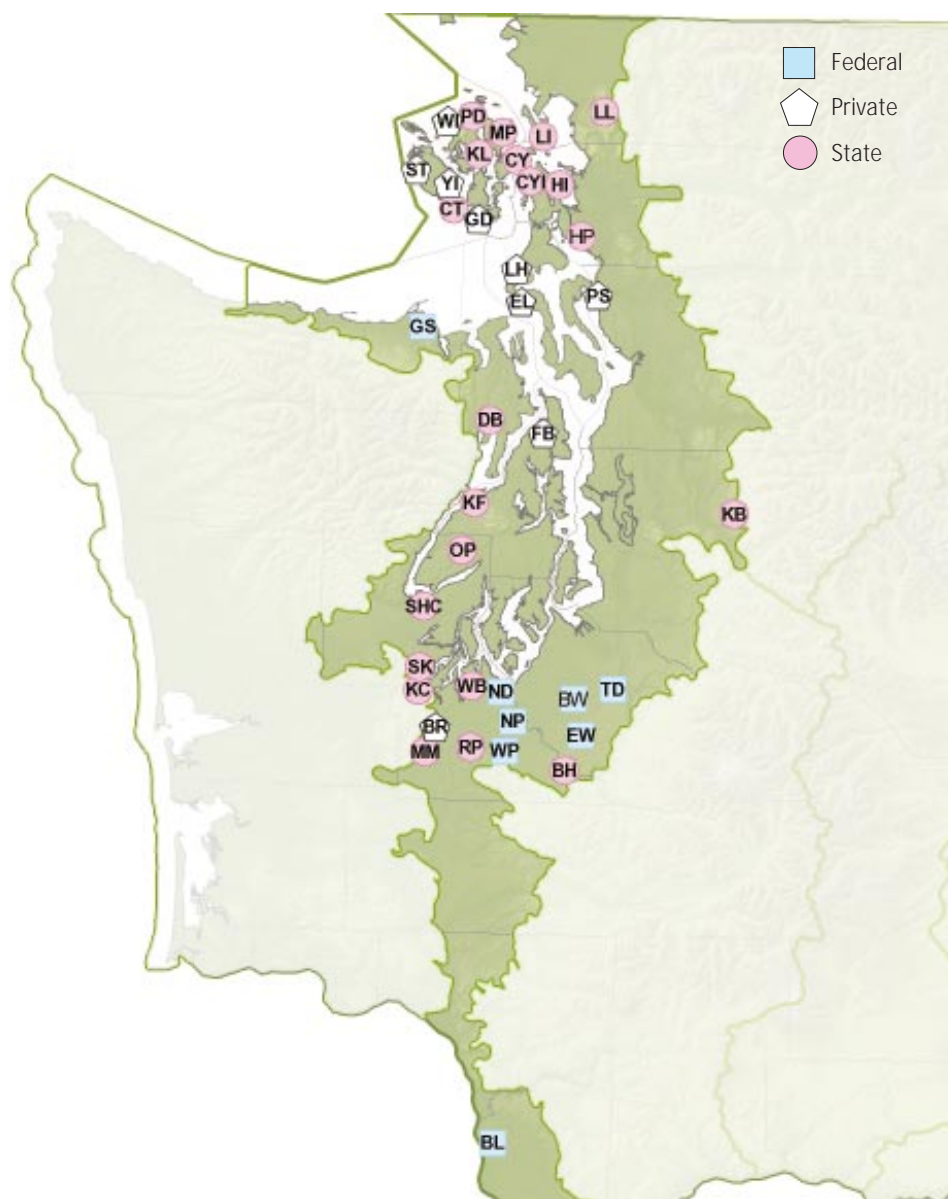


The Puget Trough ecoregion is nestled between the Cascade and Olympic Mountains and the Willapa Hills. It includes Puget Sound and the lowlands south to the Columbia River. The ecoregion extends north into the Georgia Basin in British Columbia and south into the Willamette Valley in Oregon. Roughly 8 percent of Washington is within this ecoregion. It is by far the most populated ecoregion in Washington; as of 1991, more than 50 percent of the Washington portion had been converted to urban and agricultural uses (Washington GAP, 1997).

Physiography: The Puget Trough ecoregion includes the marine waters of Puget Sound and the lowlands generally up to about 1,000 feet above sea level. A few isolated highlands within the ecoregion extend up to 2,400 feet in elevation. Pleistocene glaciers left glacial till plains over much of the area north of Olympia, and outwash plains between Tacoma and Centralia. Ancient, well-weathered soils predominate between Centralia and Clark County. Pleistocene flood events formed the smooth floor of the Portland Basin in the vicinity of Vancouver. In the far north, the San Juan Islands and mainland hills are composed of rocks common in the adjacent mountainous ecoregions. Large, low-gradient rivers typically begin in the adjacent mountains and flow through this ecoregion. Many small streams originate at low elevations. Freshwater lakes are numerous in the glaciated portions of the ecoregion.

Climate: Much of the Washington portion of the ecoregion is influenced by the rain shadow effect of the Olympic Mountains and Willapa Hills. Precipitation, primarily rain, averages 20 to 70 inches per year. Summers are warm and dry compared to elsewhere in western Washington, and winters are relatively mild.

Biota: The vegetation of the Puget Trough is dominated by Douglas-fir forests with western hemlock and redcedar as the primary late-successional species. Oregon white oak, Pacific madrone, bigleaf maple, and red alder forests are frequent components of the landscape. Grassland habitats are often associated with oak habitats and support a number of rare species, including the federally threatened golden paintbrush and a number of butterfly species. Historically, frequent fires maintained these grasslands and the adjacent open oak woodlands. Many rare grassland species are declining as this landscape becomes more urbanized and fire suppression leads to more densely forested areas. Other special habitats within the ecoregion include wetlands, riparian areas, bogs and estuaries.



Because of their close proximity on the ground, some natural areas in this ecoregion share a single symbol on this map.

NATURAL AREAS IN THE PUGET TROUGH ECOREGION IN WASHINGTON

Federal

Blackwater Island RNA - **BL**
 Bower Woods RNA - **BW**
 Ellsworth Woods RNA - **EW**
 Graveyard Spit RNA - **GS**
 Nisqually Delta RNA - **ND**
 Nisqually Floodplain RNA - **NP**
 Thirteenth Division Prairie RNA - **TD**
 Weir Prairie RNA - **WP**

State

Bald Hill NAP - **BH**
 Cattle Point NRCA - **CT**
 Cypress Highlands NAP - **CY**
 Cypress Island NRCA - **CYI**
 Dabob Bay NAP - **DB**
 Hat Island NRCA - **HI**
 Hope Island NAP - **HP**
 Kennedy Creek NAP - **KC**
 Killebrew Lake NAP - **KL**
 Kings Lake Bog NAP - **KB**
 Kitsap Forest NAP - **KF**
 Lake Louise NRCA - **LL**
 Lummi Island NAP / NRCA - **LI**
 Mima Mounds NAP - **MM**
 Mount Pickett NAP - **MP**
 Oak Patch NAP - **OP**
 Point Doughty NAP - **PD**
 Rocky Prairie NAP - **RP**
 Shumocher Creek NAP - **SHC**
 Skookum Inlet NAP - **SK**
 Woodard Bay NRCA - **WB**

Private

Black River - **BR**
 Deadman Island - **GD**
 Ebey's Landing - **EL**
 Foulweather Bluff - **FB**
 Goose Island - **GD**
 Lake Hancock - **LH**
 Port Susan Bay - **PS**
 Sentinel Island - **ST**
 Waldron Island - **WI**
 Yellow Island - **YI**

Biodiversity Highlights

- Several circumboreal species at southern edge of their ranges
- Important habitats for wide-ranging carnivores
- Relatively intact and dominated by semi-natural or natural vegetation

Major Landowners

- National Park Service
- U.S. Forest Service
- Tribes
- DNR
- Private timber companies

Dominant Land Uses

- Forestry
- Recreation
- Conservation

Principal Risks

- Incompatibility of some timber management activities
- Low density development, primarily in valley bottoms

Conservation Needs

- Protection and restoration of riparian floodplains
- Restoration of salmon habitat / populations
- Recovery of large carnivores

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	0	7	30
Animals	4	2	11
Ecosystems	3	15	35

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North Cascades Ecoregion

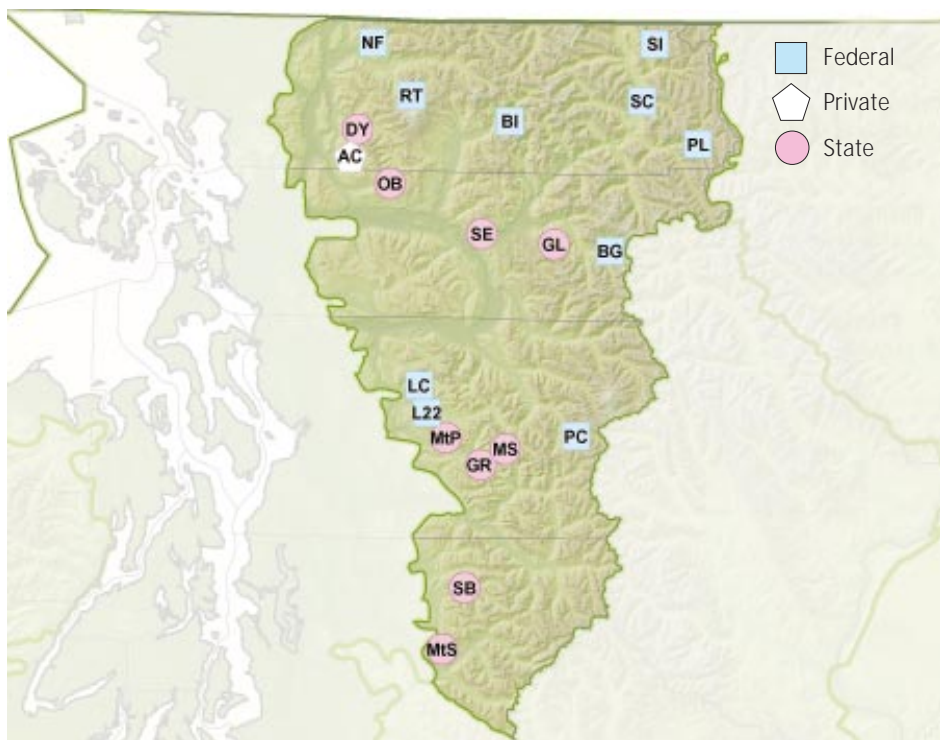


The North Cascades ecoregion includes the Cascade Mountains north of Snoqualmie Pass and west of the crest extending northward into British Columbia. Approximately 10 percent of Washington occurs within this ecoregion. As of 1991, less than 2 percent of Washington’s portion had been converted to urban and agricultural development (Washington GAP, 1997).

Physiography: The North Cascades is composed of highly dissected, glaciated mountain terrain, mostly between 1,000 and 7,000 feet above sea level. The highest peaks are volcanoes that rise to more than 10,000 feet. Valley bottoms extend down to as low as 500 feet. Glacially carved U-shaped valleys and cirques are prominent features. Watersheds typically begin as steep-gradient small stream drainages that feed major rivers leading into the adjacent Puget Trough ecoregion. Natural lakes, most of which were created by glacial processes, are plentiful.

Climate: High precipitation typifies the ecoregion, varying from around 60 to 160 inches per year. Most precipitation accumulates from October through April as snow and rain. High elevations in the mountains are covered with snow for many months. Middle elevations have significant snowpacks that fluctuate over the course of the winter with rain-on-snow events. Lower elevations within the ecoregion accumulate little snow or have transient snowpacks.

Biota: The vegetation of the North Cascades ecoregion in Washington consists mostly of western hemlock – Douglas-fir – western redcedar forests at low elevations, Pacific silver fir – western hemlock forests at middle elevations, and a mosaic of mountain hemlock – silver fir forests and subalpine parkland at high elevations. Natural stand replacement fires occur at irregular intervals of 90 to 250 years. Above the timberline, alpine heaths, meadows and fellfields are interspersed with barren rock, ice, and snow. Special habitats include riparian areas dominated by broadleaf trees, avalanche chutes dominated by Sitka alder or vine maple, and wetlands. Rare plant species in this ecoregion are often circumboreal species on the southern edge of their range, with populations scattered in the high Cascades. This ecoregion is one of the few in Washington with a variety of large carnivores, including gray wolf, grizzly bear, and wolverine. Salmon are found in most of the large rivers.



NATURAL AREAS IN THE NORTH CASCADES ECOREGION IN WASHINGTON

Federal	State	Private
Big Beaver RNA - BI	Dailey Prairie NAP - DY	Arlecho Creek - AC
Boston Glacier RNA - BG	Granite Lakes NRCA - GL	
Lake Twenty-two RNA - L22	Greider Ridge NRCA - GR	
Long Creek RNA - LC	Morning Star NRCA - MS	
North Fork Nooksack RNA - NF	Mount Pilchuck NRCA - MTP	
Perry Creek RNA - PC	Mount Si NRCA - MTS	
Pyramid Lake RNA - PL	Olivine Bridge NAP - OB	
R.J. Taylor RNA - RT	Skagit Bald Eagle NAP - SE	
Silver Lake RNA - SI	Snoqualmie Bog NAP - SB	
Stetattle Creek RNA - SC		

Biodiversity Highlights

- Columbia River Gorge and Mount Rainier rich in rare, endemic plant species
- Dominated by native vegetation

Major Landowners

- U.S. Forest Service
- National Park Service
- DNR
- Private timber companies

Dominant Land Uses

- Forestry
- Recreation
- Conservation

Principal Risks

- Incompatibility of some timber management activities
- Low density development in valleys
- Non-native species

Conservation Needs

- Protection and restoration of riparian floodplains
- Conservation of grassy balds and oak woodlands
- Conservation of Columbia River Gorge rare plants

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	3	10	25
Animals	8	3	14
Ecosystems	6	18	44

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West Cascades Ecoregion

TABLE MOUNTAIN NAP / R. WARNOCK

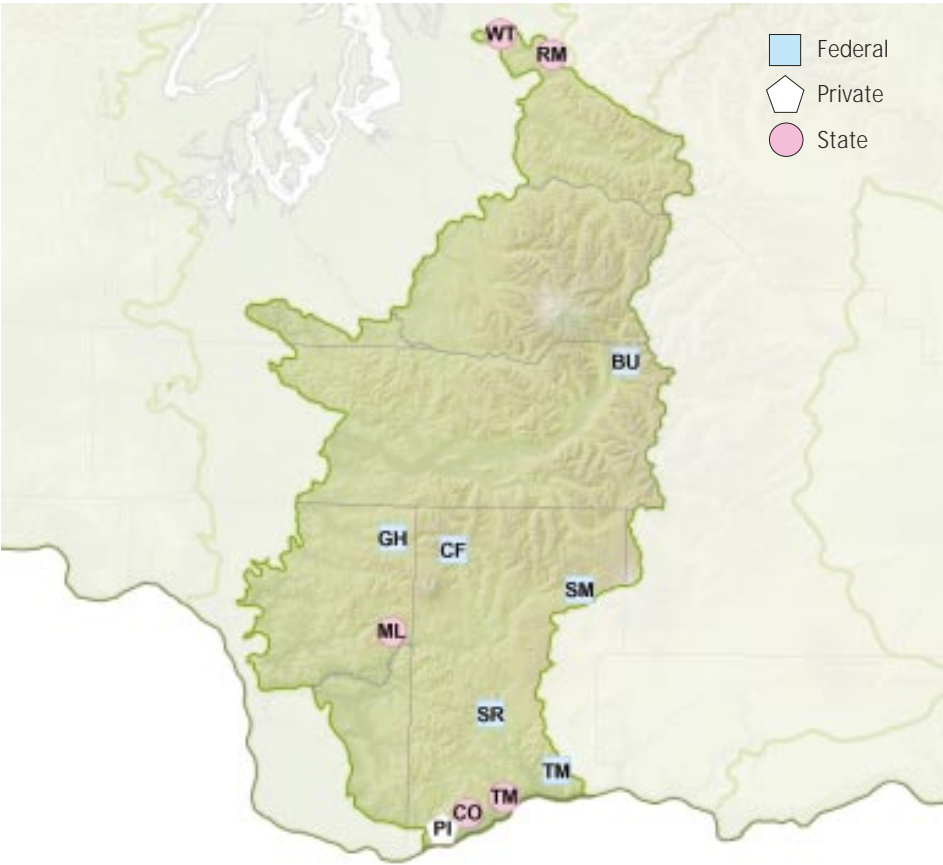


The West Cascades ecoregion extends west from the Cascade crest from Snoqualmie Pass southward to the Oregon-California border. Approximately 8 percent of Washington is within this ecoregion. As of 1991, less than 2 percent of the Washington portion had been converted to urban and/or agricultural use (Washington GAP, 1997).

Physiography: The West Cascades ecoregion consists mostly of highlands modified by montane glaciers and associated riverine valleys. The typical elevation range is 1,000 to 7,000 feet above sea level, with the highest peaks rising to more than 14,000 feet on Mount Rainier and the lowest elevations in the Columbia River Gorge at 50 feet. Isolated volcanic peaks and associated high plateaus rise above surrounding steep mountain ridges. These mountains were formed primarily from extrusive volcanic rocks. Small, steep-gradient streams typically feed major rivers. Natural lakes are frequent and typically were created by glacial processes and landslides.

Climate: The climate of this ecoregion is wet and relatively mild. Average annual precipitation ranges from about 55 to 140 inches. Most precipitation accumulates from October through April as snow and rain. High elevations in the mountains are continuously covered with snow for months. Middle elevations have significant snow pack that fluctuates over the course of the winter with rain-on-snow events. The lowest elevations accumulate little snow and generally have a transient snow pack.

Biota: Conifer forests dominate the vegetation of the West Cascades ecoregion. Douglas-fir – western hemlock forests are typical at low elevations. Middle elevations characteristically have Pacific silver fir, western hemlock, Douglas-fir, and noble fir. High elevations have mountain hemlock – silver fir forests and subalpine parklands. Higher elevations on volcanic peaks support alpine heath, meadows, and fellfields among glaciers and rock. Special habitats include riparian areas dominated by broadleaf species, wetlands, grassy balds, and oak woodlands. Mount Rainier supports a few endemic rare plant species, as does the Columbia River Gorge. Both are areas of high plant diversity. The Columbia River Gorge has added biogeographic significance because of the mixing of coastal and interior floras.



NATURAL AREAS IN THE WEST CASCADES ECOREGION IN WASHINGTON

Federal	State	Private
Butter Creek RNA - BU	Columbia Falls NAP - CO	Pierce Island - PI
Cedar Flats RNA - CF	Merrill Lake NRCA - ML	
Goat Marsh RNA - GH	Rattlesnake Mountain Conservation Area - RM	
Sister Rocks RNA - SR	Table Mountain NRCA - TM	
Steamboat Mountain RNA - SM	West Tiger Mountain NRCA - WT	
T.T. Munger RNA - TM		

Biodiversity Highlights

- Relatively intact and dominated by natural or semi-natural vegetation
- Two of state's highest concentrations of rare plants are in Columbia River Gorge and Wenatchee Mountains
- Southern portion contains fescue grasslands with Mardon Skipper, a federal candidate butterfly more commonly associated with Puget Trough

Major Landowners

- U.S. Forest Service
- Tribes
- DNR
- WDFW
- Private timber companies

Dominant Land Uses

- Forestry
- Livestock grazing
- Recreation
- Conservation

Principal Risks

- Fire suppression/catastrophic fire
- Non-native species
- Incompatibility of some timber management activities
- Low to medium development in valleys

Conservation Needs

- Coordinated strategy for recovery of dry, open, low elevation ponderosa pine forests
- Improving representation of ponderosa pine and other low elevation ecosystems within natural areas system
- Exotic plant control, particularly in grassland habitats
- Coordinated salmonid recovery

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	10	29	45
Animals	6	7	19
Ecosystems	5	17	25

See the Natural Heritage Program website for list.
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East Cascades Ecoregion



The East Cascades ecoregion lies east of the Cascade crest, from Sawtooth Ridge near Lake Chelan south to the Oregon-California border. Its eastern border follows the montane forest – lowland shrub-steppe transition. Approximately 10 percent of Washington is included within this ecoregion. As of 1991, less than 2 percent of the Washington portion had been converted to agricultural or urban development (Washington GAP, 1997). The development that has occurred is concentrated in the Chelan, Wenatchee, upper Yakima, and Little White Salmon valleys.

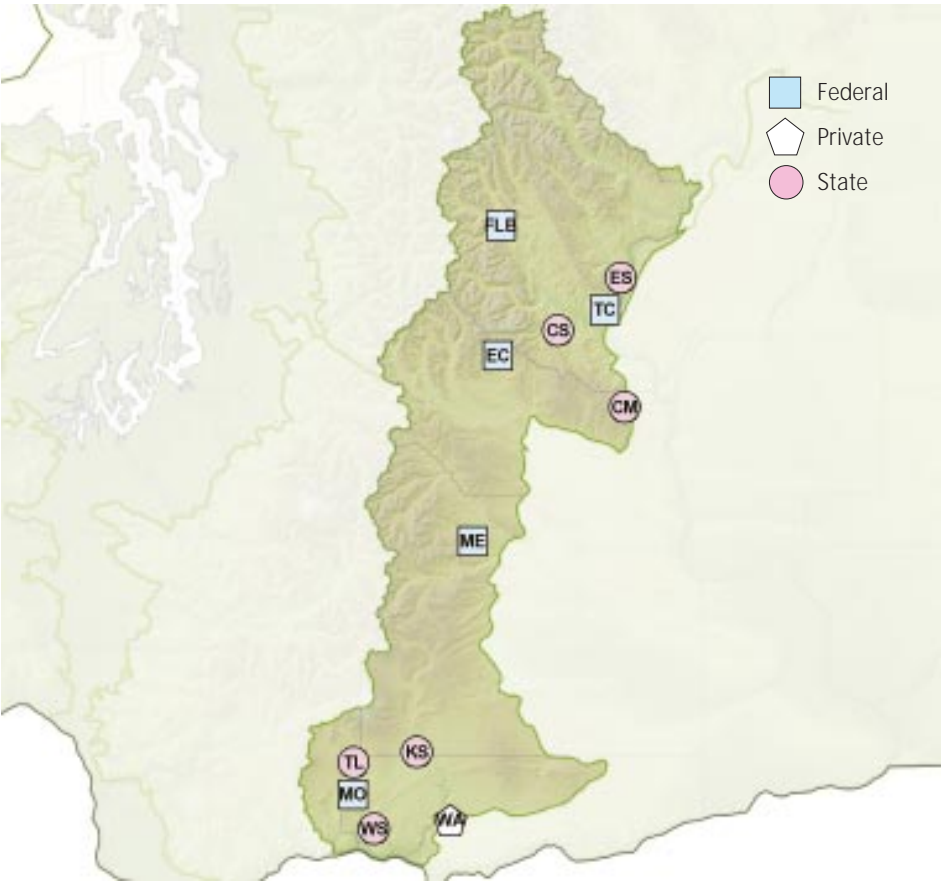
Physiography: The East Cascades of Washington were modified by alpine glaciers and landslides which created rugged ridges extending southeast to east from the Cascade crest. Broad valleys occupy the lowlands between the mountain ridges. Isolated volcanic cones appear on the steep mountain ridges, but are not as high as volcanoes in the Western Cascades. The East Cascades have a varied geology, including large serpentine areas in the Wenatchee Mountains. The typical elevation range is between 2,000 and 7,000 feet. Mt. Adams is the highest peak at 12,276 feet. The lowest elevation is in the Columbia River Gorge at 100 feet. The Wenatchee and Simcoe mountains are eastward extensions of this ecoregion.

Climate: The climate changes rapidly west to east, from cold with high precipitation (120 inches) along the Cascade crest to hot and dry with less than 20 inches per year along the foothills. Most precipitation accumulates from November through April. A snow pack develops at higher elevations.

Biota: Conifer forests dominate the East Cascades ecoregion. They are usually more open and patchy than forests of ecoregions west of the Cascades. Grand fir – Douglas-fir – ponderosa pine forests are characteristic types. Oregon white oak woodlands appear at lower elevations in the southern half of the ecoregion, and subalpine fir – mountain hemlock – Engelmann spruce types are found at higher elevations. Douglas-fir – western hemlock – Pacific silver fir forests are present and can be locally abundant near low divides of the Cascades. Whitebark pine, lodgepole pine, and western larch are common components of these forests.

Historically, stand replacement fires occurred at irregular intervals from 10 years in the lowland foothills to 150 years or more at high elevations. Decades of fire suppression have resulted in large areas of dense, fire-prone forests.

Shrub-steppe vegetation occurs along the foothills and higher south-facing slopes in the ecoregion, generally composed of big sagebrush or antelope bitterbrush with native bunchgrasses. Alpine and subalpine parklands occur on the highest ridges, more commonly so north of Snoqualmie Pass.



NATURAL AREAS IN THE EAST CASCADES ECOREGION IN WASHINGTON

Federal	State	Private
Eldorado RNA - EC	Camas Meadows NAP - CS	Wahkiacus Oaks - WA
Fish Lake Bog RNA - FLB	Colockum Spur NAP - CM	
Meeks Table RNA - ME	Entiat Slopes NAP - ES	
Monte Cristo RNA - MO	Klickitat Scenic River NRCA - KS	
Thompson Clover RNA - TC	Trout Lake NAP - TL	
	White Salmon Oak NRCA - WS	

Biodiversity Highlights

- Relatively intact, dominated by natural or semi-natural vegetation
- High concentrations of rare plant species Chopaka Mountain and Kettle Range
- Boreal species are at southern edge of their range,
- Columbia and Great Basin species at northern edge of their range
- Important for wide-ranging carnivore species

Major Landowners

- U.S. Forest Service
- Tribes
- DNR
- WDFW

Dominant Land Uses

- Livestock grazing
- Forestry
- Recreation
- Conservation

Principal Risks

- Excessive grazing
- Non-native species
- Incompatibility of some timber management activities
- Fire suppression / catastrophic fire
- Low to medium density development

Conservation Needs

- Coordinated recovery of dry, open, low elevation ponderosa pine – Douglas-fir forests
- Improving representation of low elevation ecosystems within natural areas system
- Maintenance of lodgepole pine forests
- Exotic plant control in shrub-steppe
- Coordinated riparian ecosystem and fish recovery efforts
- Coordinated recovery of grizzly bear, gray wolf, lynx, and martin

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	1	10	58
Animals	5	9	21
Ecosystems	15	21	26

See the Natural Heritage Program website for list. Click on the site map/index at: www.dnr.gov.wa

Okanogan Ecoregion



DAVIS CANYON NAP

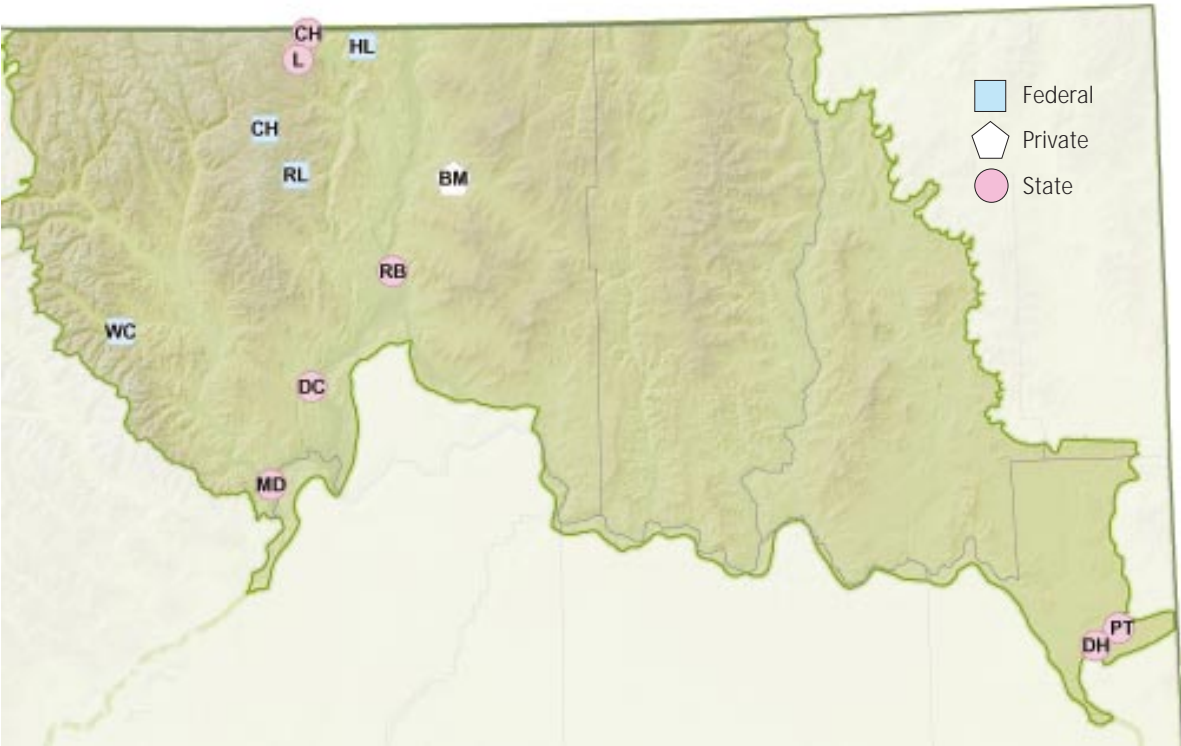
The Washington portion of the Okanogan ecoregion extends from the Cascade crest in the North Cascades east to the Selkirk Mountains. The ecoregion extends up the east slope of the Cascades into Canada and along the west slope of the Canadian Rockies to Kamloops, British Columbia. The southwestern border of the ecoregion follows Sawtooth Ridge northeast of Lake Chelan. The Methow and Okanogan valleys are included, as are the Okanogan Highlands east to the Colville and Spokane valleys. Approximately 14 percent of Washington is within this ecoregion. Less than 10 percent of the Washington portion had been converted to agricultural or urban use as of 1991 (Washington GAP, 1997). Development is concentrated in the Spokane, Colville, Methow and Okanogan valleys.

Physiography: The Okanogan ecoregion is less distinct than other Washington ecoregions. It is more transitional, much of it having characteristics of adjacent areas. The northeast Cascades are the highest and most rugged part of the ecoregion, with peaks rising to more than 9,400 feet. The high mountains give way to a series of valleys with the lowest elevations around 750 feet. To the east, the mountains are more rounded. The Kettle Range and Huckleberry Mountains are prominent features. Continental and alpine glaciers played a major role in shaping the landforms of this ecoregion.

Climate: Overall, this ecoregion has the coldest climate in the state. The western part of the ecoregion is in the rain shadow of the Cascade Mountains, while the eastern part is in a zone of increasing precipitation created by the Rocky Mountains. The ecoregion is influenced by the extremes of hot, dry air from the Columbia Basin in the summer and cold, dense arctic air in the winter. Annual precipitation is variable, from less than 12 inches in the Okanogan Valley to 50 to 90 inches in the Cascades. Most of the ecoregion falls within a 14 to 24 inch zone. There are fairly steep temperature and precipitation gradients from the mountains to the valleys within this ecoregion.

Biota: Conifer forests dominate the mountain ridges and low hills in the ecoregion, while valleys and lowlands are often non-forested. The conifer forests are more open and less continuous, consisting of smaller stands, than are forests west of the Cascade crest and in the Canadian Rockies. Douglas-fir – ponderosa pine form the ecoregion's characteristic forests. They transition to shrub-steppe in the low broad valleys in the eastern part of the ecoregion, and to grasslands in the western part. Subalpine fir – Engelmann spruce forests occur at higher elevations. Whitebark pine, lodgepole pine, and subalpine larch form parklands in the highest elevations, often associated with dry alpine or subalpine meadows. The moister forests are dominated by Douglas-fir, with western larch, western white pine or quaking aspen as common components.

Historically, stand replacement fires occurred at irregular intervals from 10 years in the lowland foothills to 150 years or more at high elevations. Decades of fire suppression have resulted in a landscape composed of dense, fire-prone forests.



Some natural areas in this ecoregion are under dual ownership (state and private). The appropriate site name has been included in both ownership columns, but only one symbol has been placed on the map.



NATURAL AREAS IN THE OKANOGAN ECOREGION IN WASHINGTON		
Federal	State	Private
Chewuch River RNA - CH	Barker Mountain NAP - BM	Barker Mountain NAP - BM
Hot Lake RNA - HL	Chopaka Mtn. NAP - CH	
Roger Lake RNA - RL	Davis Canyon NAP - DC	
Wolf Creek RNA - WC	Dishman Hills NRCA - DH	
	Loomis NRCA - L	
	Methow Rapids NAP - MD	
	Pinecroft NAP - PT	
	Riverside Breaks NAP - RB	

Biodiversity Highlights

- Presence of moose, grizzly bear, mountain caribou
- Plant species common in Rocky Mountains, but rare in Washington.
- Rocky Mountain grand fir – western hemlock – western redcedar forests

Major Landowners

- U.S. Forest Service
- U.S. Fish & Wildlife Service
- DNR
- State Parks

Dominant Land Uses

- Forestry
- Rangeland
- Recreation
- Conservation
- Mining

Principal Risks

- Fire suppression / catastrophic fire
- Low to medium density development at low elevations

Conservation Priorities

- Wetland habitats (bogs, riparian areas, etc.) for rare plants, amphibians, and fish
- Coordinated recovery efforts for salmon along Pend Oreille and Columbia rivers
- Coordinated recovery efforts for woodland caribou, grizzly bear, gray wolf, lynx and martin in Selkirk Mountains.
- Coordinated strategy for recovery of low elevation, dry, open ponderosa pine – Douglas-fir forests

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	1	9	29
Animals	4	3	11
Ecosystems	5	19	11

See the Natural Heritage Program website for list.
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Canadian Rockies Ecoregion

LITTLE PEND OREILLE RIVER MAP



The Canadian Rockies ecoregion is located in the northeastern corner of Washington. The vast majority of this ecoregion occurs in adjacent British Columbia and Idaho, extending into Alberta and Montana. Approximately 4 percent of Washington is within this ecoregion. As of 1991, less than 10 percent of the Washington portion had been converted to agricultural and urban land uses. Development is concentrated in low, broad valleys along the Pend Oreille River.

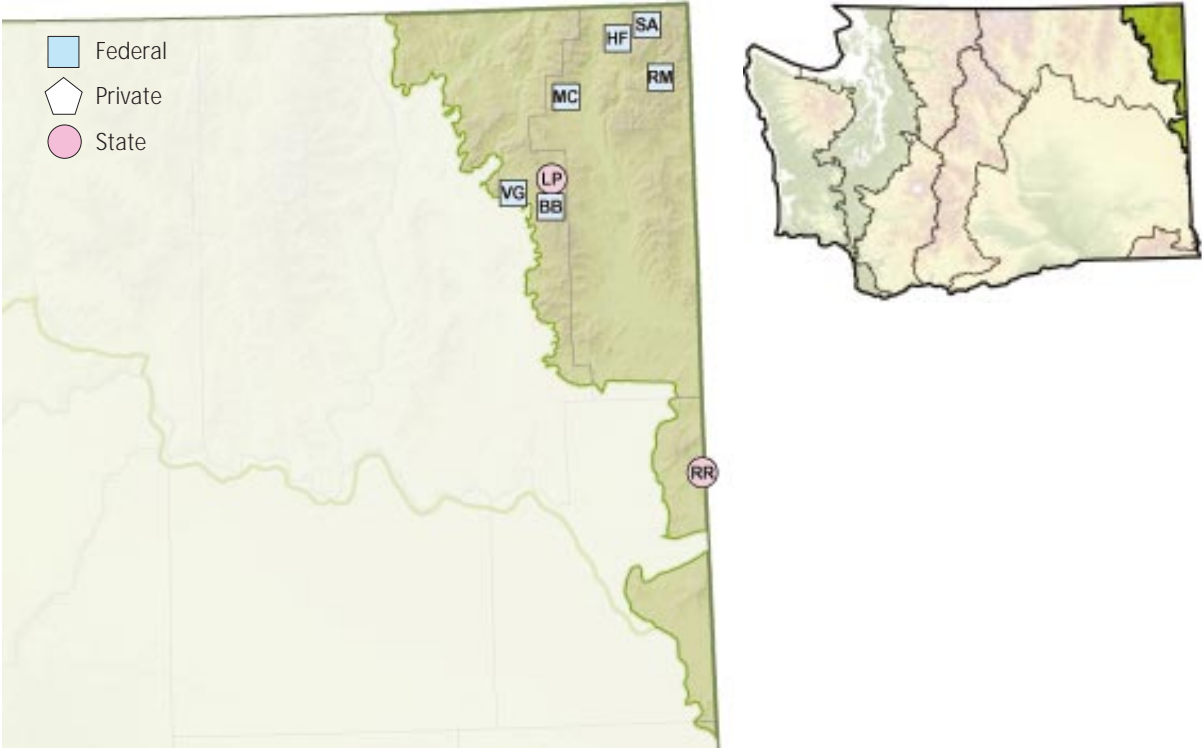
Physiography: The Selkirk Mountains and the north flowing Pend Oreille River are the dominant landforms of this ecoregion in Washington. The Selkirk Mountains are transitional between the rolling Okanogan Highlands to the west and the higher ridges and mountains interspersed with wide valleys to the east. The Washington portion of the ecoregion was completely glaciated and now displays ice-carved, U-shaped valleys and isolated ice-sculpted mountain peaks. Elevations range from 1,300 feet along the Columbia River to greater than 7,000 feet in the Salmo-Priest Wilderness Area.

Climate: Annual precipitation ranges from less than 18 inches along the Columbia River south of Northport to around 80 inches in the Salmo-Priest Wilderness Area. Most of the ecoregion falls within a 24 to 34 inch precipitation zone. Significant snowpack develops at mid- and upper elevations.

Biota: Coniferous forests dominate this ecoregion. The composition of the forests reflects variation in moisture, temperature and elevation. Douglas-fir – ponderosa pine forests occur at low elevations; grand fir – western hemlock – western redcedar forests are characteristic of mid-montane elevations; and subalpine fir – Engelmann spruce forests are found at higher elevations. Whitebark pine, lodgepole pine, and subalpine larch form parklands in the highest elevations. Western larch and western white pine can be major components of the moister forests.

Fire has played a significant role in the development of the forests in this ecoregion, with a 10-year return interval in the lowland foothills and a 150-year return interval at high elevations and in protected canyons. Decades of fire suppression have resulted in dense, fire-prone forests.

Grasslands occur along the foothills and on higher elevation, south-facing slopes. These grasslands are variously dominated by green fescue, Idaho fescue, or rough fescue.



NATURAL AREAS IN THE CANADIAN ROCKIES ECOREGION IN WASHINGTON

Federal	State	Private
Baird Basin RNA - BB Halliday Fen RNA - HF Maitlen Creek RNA - MC Round Top Mountain RNA - RM Salmo RNA - SA Varline Grove RNA - VG	Little Pend Oreille River NAP - LP Ragged Ridge NAP - RR	

Biodiversity Highlights

- Relatively intact, dominated by natural or semi-natural vegetation
- A number of endemic plant species in Blue Mountains and Snake River Canyon

Major Landowners

- U.S. Forest Service
- WDFW

Dominant Land Uses

- Agriculture
- Forestry
- Recreation
- Conservation

Principal Risks

- Excessive grazing
- Non-native species
- Incompatibility of some timber management activities

Conservation Priorities

- Coordinated strategy for recovery of low and mid-elevation open ponderosa pine – Douglas-fir forests
- Non-native plant species control in canyon grasslands
- Improved protection of riparian habitats

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	5	10	8
Animals	1	3	11
Ecosystems	2	8	5

See the Natural Heritage Program website for list.
Click on the site map/index at: www.dnr.gov.wa

Blue Mountains Ecoregion

BLUE MOUNTAINS / ED ALVERSON



The Blue Mountains – Middle Rockies ecoregion extends from adjacent Idaho and Oregon into the southeast corner of Washington. It includes the Grande Ronde and Snake River canyons northward to a few miles south of Clarkston. Approximately 1 percent of Washington is within this ecoregion. As of 1991, less than 1 percent of the Washington portion had been converted to agricultural or urban development

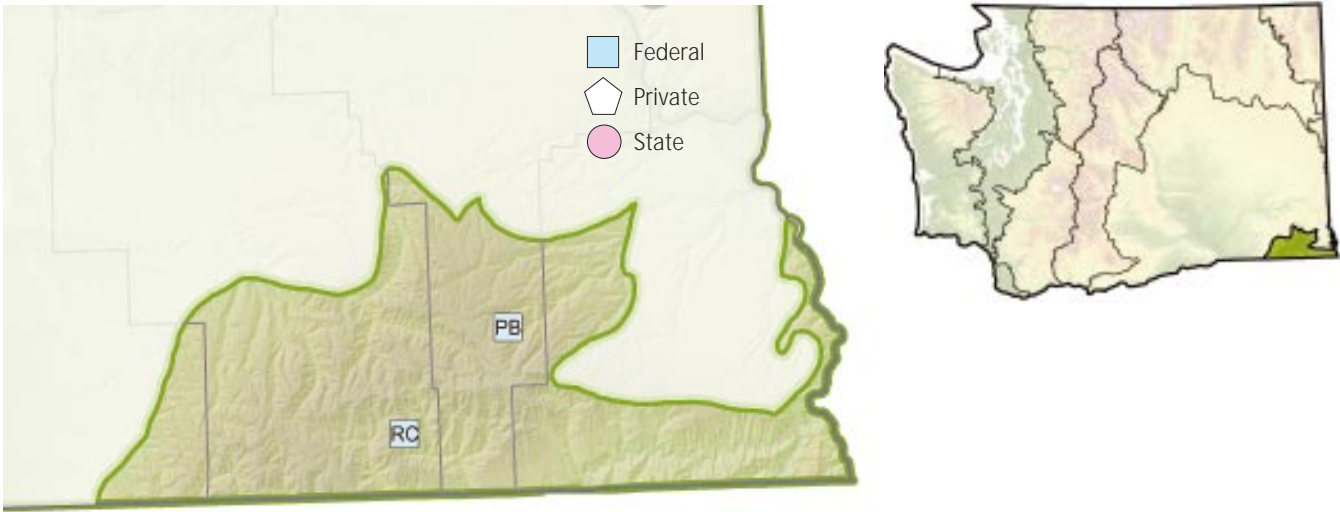
(Washington GAP, 1997). The limited development that has occurred has been along the Grand Ronde River.

Physiography: Columbia River Basalt flows were uplifted to form the Blue Mountains, which were simultaneously down-cut by the Grande Ronde and Snake Rivers. Today, flat top plateaus above deep canyons are characteristic of Washington's Blue Mountains. The typical elevation range is between 2,000 and 4,000 feet, with the highest peak at 6,387 feet and the lowest elevation at 750 feet along the Snake River. Windblown silts and volcanic ash cover most of the plateaus, providing material for soil development.

Climate: Annual precipitation ranges from less than 10 inches in the canyon of the Grande Ronde River to more than 50 inches twenty-five miles to the west in the Wenaha-Tucannon Wilderness Area. Most of the ecoregion is within a 14 to 24 inch precipitation zone. Much of the precipitation appears as snow, although fall and spring rains are common, often creating flood events.

Biota: The Blue Mountains ecoregion is dominated by coniferous forest, but because of its characteristic abrupt topography and wide elevation ranges, it also supports grasslands and shrublands along low dry canyons, on broad plateaus and in subalpine meadows. Douglas-fir – ponderosa pine forests are characteristic of the low and middle elevations, with subalpine fir – Engelmann spruce types occurring at higher elevations. Western larch, lodgepole pine, and western white pine are components of mesic forests. Canyon grassland vegetation occurs on the steep slopes above the Grande Ronde and Snake Rivers. Plateau grasslands appear within the forest matrix. Dense shrublands occur in the higher canyons along the Oregon border.

Historically, stand replacement fires occurred at irregular intervals from 10 years in the lowland foothills to 150 years or more at high elevations. Decades of fire suppression have resulted in a semi-natural to natural landscape composed of dense, fire-prone forests.



NATURAL AREAS IN THE BLIE MOUNTAINS ECOREGION IN WASHINGTON

Federal	State	Private
Pataha Bunchgrass RNA - PB Rainbow Creek RNA - RC		

Biodiversity Highlights

- Rich endemic flora
- Many annual plant species more commonly found in Great Basin
- Many bird species dependent on shrub-steppe habitat

Major Landowners

- Bureau of Land Management
- US Fish and Wildlife Service
- US Department of Defense
- DNR
- WDFW

Dominant Land Uses

- Agriculture
- Livestock grazing
- Conservation of fish & wildlife habitat

Principal Risks

- Continued conversion of shrub-steppe to agriculture
- Low density development
- Non-native species
- Excessive grazing

Conservation Needs

- Control of exotic plants in shrub steppe and grasslands
- Protection and rehabilitation of remnants of Palouse Prairie
- Coordinated recovery planning for pygmy rabbit, sage grouse, sharptail grouse, shrub steppe birds, and salmonid species
- Conservation planning for sand dune and vernal pool habitats and associated species
- Inventory for, and assessment of status of, selected aquatic and terrestrial invertebrates

Priorities for Inclusion Within the Natural Areas System

Priority	1	2	3
Plants	15	37	50
Animals	10	13	21
Ecosystems	26	21	11

See the Natural Heritage Program website for list.
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Columbia Plateau Ecoregion



PALOUSE RIVER

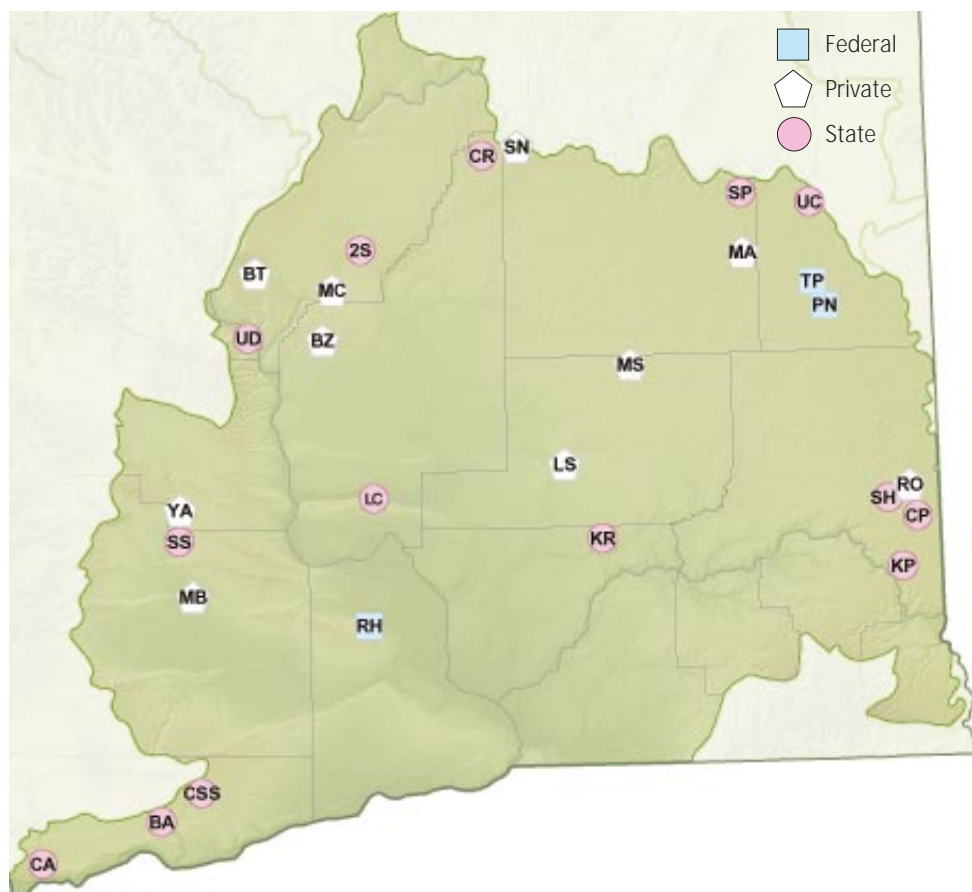
The Columbia Plateau ecoregion includes the area in eastern Washington bounded by the Cascade, Okanogan, Blue and Rocky Mountains. It extends south in eastern Oregon to the Nevada border and then east to the Snake River Plain in Idaho. Approximately one-third of Washington is in this ecoregion. More than 50 percent of the Washington portion of this ecoregion has been developed for agricultural or urban use (Washington GAP, 1997). Agriculture consists of a mixture of dryland and irrigated farming. Urban development is mostly associated with rivers and lakes.

Physiography: The primary, nearly exclusive, bedrock of this ecoregion is Columbia River basalt. Windblown silts and volcanic ash cover extensive areas, having created rolling, deep, productive soils. Ice-age floods carved deep canyons and coulees through the basalt. The floods also scoured some areas of soils and vegetation, leaving the basalt exposed on the surface. The ecoregion's dominant landforms include the Palouse Hills, Channeled Scablands, Yakima Fold Hills, and Pasco Basin. Elevations range from 160 feet above sea level along the Columbia River in the southwestern corner to nearly 4,000 feet above sea level on isolated hills (Badger and Tekoa mountains).

Climate: This is the hottest and driest ecoregion in the state. It lies in the rain shadow of the Cascade Mountains. Annual precipitation generally increases west to east from around 6 inches per year along the Hanford Reach of the Columbia River to 25 inches in the Palouse Hills. Most of the ecoregion receives 8 to 14 inches of precipitation. Periodic drought and fire are common environmental features of this ecoregion. Fires once occurred at irregular intervals of 10 to 50 years.

Biota: The ecoregion is most often characterized as shrub-steppe dominated by various species of sagebrush and bunchgrasses. Most of the ecoregion's remaining native vegetation occurs on steep canyon sides and on the shallower soils of basalt scablands. Bitterbrush and three-tip sagebrush steppe appear along the foothills of the Cascades. Douglas-fir – ponderosa pine forests occur on the moister sites near the foothills of the surrounding mountains. Special habitats include sand dunes, gravelly areas, basalt cliffs, steep canyons, alkali lakes and vernal pools.

Many grassland and shrub-steppe species in this ecoregion are declining. Isolation and fragmentation of intact habitat is a primary factor. Non-native, weedy plant species are also a factor; they are a persistent and increasing feature of the limited semi-natural and natural landscape.



Some natural areas in this ecoregion are under dual ownership (state and private). The appropriate site name has been included in both ownership columns, but only one symbol has been placed on the map.

NATURAL AREAS IN THE COLUMBIA PLATEAU ECOREGION IN WASHINGTON

Federal	State	Private
Pine Creek - PN	Badger Gulch NAP - BA	Badger Mountain - BT
Rattlesnake Hills - RH	Campus Prairie BSA - CP	Beezley Hills - BZ
Turnbull Pine - TP	Castle Rock NAP - CR	Lind Shrub Steppe - LS
	Cleveland Shrub Steppe NAP - CSS	Magnuson Butte - MA
	Columbia Hills NAP - CA	Marcellus Shrub Steppe - MS
	Kahlotus Ridgetop NAP - KR	McCartney Creek - MC
	Kramer Palouse BSA - KP	Moxee Bog - MB
	Lower Crab Creek NAP - LC	Rock Creek - BA
	Selah Cliffs NAP - SS	Rose Creek - RO
	Smoot Hill BSA - SH	Seaton Canyon - SN
	Spring Creek Canyon NAP - SP	Yakima River Canyon - YA
	The 2 Steppe NAP - 2S	
	Upper Deep Creek NAP - UC	
	Upper Dry Gulch NAP - UD	

